Guidebook for Soliciting 2016 Smart City Research Topics

by

Chinese Society for Urban Studies

For implementing the ‘guiding opinions of the CPC Central Committee and the State Council on deepening the reform of urban law enforcement system and improving urban management work’ (December 24th, 2015), and carrying out the ‘national new urbanization plan’ (2014-2020), Chinese Society for Urban Studies (CSUS) engages in researching city science and technology frontier for fundamental breakthrough, mastering the core technology of the smart city industrial development, strengthening the application model of innovation and integration innovation, expanding the application of information technology, supporting a new generation of smart urban industrial development, and etc. . On the basis of previous work, and focus on the theme of big data international standards, urban simulation, grid management, international cooperation, and etc., NSCJL plan to collect alternative projects in the direction of the strategic direction and cutting-edge technology. In order to do a good job in the construction of the 2016 annual urban science and alternative project, and to carry out the work of CSUS better, this guidebook has been made.

## 1. Research Topics

### a. Strategic Orientation

#### 1.1 Overall Research Directions on Smart City Construction & Development of New-type Urbanization

The 18th National Congress of CPC indicates that new-type urbanization should be impelled by the aim of building the moderately prosperous society, and transforming economic growth pattern, also, constructing with intensive, smart, green, and low-carbon way. Currently, China has been encountered some bottlenecks in urbanization construction, therefore, the Chinese governments have made the policies that new-type urbanization construction should insist on these principles: people oriented, four modernizations synchronization, layout optimized, ecological civilization, and culture inheritance. Promoting new-type urbanization in a smart way is a significant method to arrange goods and materials, information and resources which used for constructing cities, and motivate new IT innovations. Also, it can realize sound development for economy, society and science in city, due to the reason that it complies with new concept and new trends of modern city development. In Mar. 2016, Chinese premier Li Keqiang put forward an instruction in the State of Nation Report that building smart city to improve residential environment, which means make them live more eased, convenient, and comfortable. Moreover, promoting city sound and sustainable development in a smart way requires the governments comply by the new-type urbanization policies to carry on research. Nowadays, a new round revolution --- scientific and technical revolution has been taken place in the world and new-type urbanization has been carried out in China, so smart city will be an efficient support for boosting technology innovation and economic structure optimizing. In conclusion, this research topics focus on the discussion of the relationship between new-type urbanization and smart city construction, and innovative ideas and corporative patterns could be adopted in the next 5 years.

#### 1.2 ‘One Belt One Road ’Strategic (B&R Strategic) Guiding the Research on Smart City Global Participation Construction Pattern

Coping with the immense global transformation and planning international and domestic situations as a whole, China’s Secretary-general Xi Jinping puts forward the significant policy B&R, and it is considerable for implementing the Chinese new round Opening-up policy and cooperating with the Silk Road Economic Belt countries. Currently, in-depth development of economic globalization, regional economic integration and trade & investment pattern transformation has put Asia and Europe in a critical moment for exploring their potential intra-area and arouse the vigor to cooperate with other countries. Therefore, B&R Strategy could be able to meet the needs for the countries which along the Silk Road to the large extent, and it could create an opportunity for these countries opening up to the world and obtain win-win relationship. Some Chinese companies that contributing their efforts in domestic smart city constructions own their practical experience and proprietary intellectual property rights, and they have been looking forward to participate in international scope, in terms of international standards, cooperation and research.

## 2 Research on advanced technology

#### 2.1 Studies on Smart community infrastructure data exchange and Sharing Construction Research (International Standard)

During the urbanization, especially currently the world is experiencing the rapid urbanization, full and accurate information about these community infrastructures is basic and important for processes of the city planning, construction and operation. However, related data is stored decentralized, and it is difficult for different domains and divisions to share and update data synchronously. To guarantee continuous services, scientific city planning should make a city more security, friendly and livable, it is necessary to study how to share related data. And this requires to developing a data sharing structure to achieve interoperability of the data in the systems of different departments, bureaus.

The standardization research on the technology like the CCKS (Combined Credit Key System) is our country’s independent intellectual property right in the field of information security and data system, and it focuses on the international standard including basic information security standards on smart city information resource sharing and opening. This project is an established project in ISO TC268 SC1.

Goal: Achieving data interoperability in the systems of different departments and bureaus.This Technical Report aims to facilitate:

- Building a common tangible mechanism to share data between related cities or community planners, managers, maintainers and service providers;

- Sharing real-world models and city data for simulation tools between interacting communities and cities;

- Sharing evidence-based knowledge between organizations (in charge of e.g. planning, energy, mobility, water, food) to scale up community innovation.

#### 2.2 Study on the establishment of the city simulation system to support the scientific system of the city policy decision

The modern cities are developing rapidly and the city management innovates which constantly along with the science (internet, big data, cloud computing, IT information and so on) changing from day to day. By the end of 2015, the CPC Central Committee and the State Council issued the document No. 37, proposed to ‘build the city simulation system’. The application of the city simulation will not only promote the integration of the big data of the city, but also explore the city development law in economics, politics, culture, and environment etc., and will be able to achieve the aim to predict the city accidents at last. With the visualization (animation, large screen projection, dome projection, and 3D holographic projection etc.), all the simulated results will be showed to anyone who can easily and directly perceived through their senses, and will help the city to carry out scientific construction, management and operation. Smart City Joint Laboratory will cooperate with the relevant research institutes at home and abroad, for establishing an integrated all-in-one command center, which will include the simulation, experience and emergency response, to achieve **“the integration of multi standards"** and promote all-round smart development of the city. Based on the previous basic work, we will decide to start the simulation research on focusing the following contents, including but not limited to:

1) Simulation of the city environment (including heat island, wind environment, water environment, water resources, large-scale city simulation of pollutant diffusion etc.)

2) Traffic simulation of the city

3) Simulation of city safety water supply and energy supply flexibility

4) Simulation of the city street lighting system

#### 2.3 Effect evaluation of public information service based on Grid Management in smart city (community)

Urban grid management using digital technology, information methods, and effectively integrate urban public service resources，then the grid management are able to serve the needs of the masses personally and diversely. Strengthening synergy and linkage within different management levels, such as cities, districts, streets, and communities, is a method to solve the problems that each single department cannot solve.

Evaluation of the effect of public service on smart city (community)，is an effective way to enhance the efficiency of urban management services. On the basis of previous research results and future priorities, the joint lab decided to carry out relevant research cooperation, including but not limited to:

1) Research on smart city (community) grid management mechanism;

2) Research on collaborative management mechanism of information sharing urban grid research;

3) Research and Design on urban grid management system; (Based on grid management of the city / community Public Information Platform);

4) Smart City (community) Grid Management Evaluation Index System;

5) Grid Management and Urban Governance Innovation Case Study;

6) Research on Evaluation System of grid management.

#### 2.4 Smart, Ecology and Sponge city design & engineering with international cooperation investment pattern

Mainly, we focus on the strategy of China and opening up to global strategy in terms of international organizations, financial institutions, national strategy, enterprises' wisdom, ecological development and sponge city etc.

The key point is research on the design, engineering and construction pattern of corporations in Smarter City project which built overseas, such as China-EU Smart City cooperation, World Bank invested Chinese Smart City projects, China-German Ecological City project, China-Finland Ecological City project, etc. As well as the projects located in China which invested by overseas, like Mitsui and Panasonic invested Smarter City projects in China.

This Guidebook is used for helping local governments understand new tendency, new concept and new pattern of design and engineering of overseas smart, ecology and sponge city, and also provide the strategy and international layout references for Chinese enterprises.

#### 2.5 Studies on the Influence and Growth Prediction of ICT and Other Emerging Modern Technologies Applied for Urbanization

Currently, new technologies such as IoT, cloud computing, big data, etc., have been playing an increasingly significant role in urbanization. For instance, big data is crucial in government function transformation for saving manpower and time, then these civil servants are able to focus on serving the public, therefore it is efficient.

Such new technologies applying in smart city construction will give rise to a new city transformation, specifically, efficient urban management, convenient living condition, and optimized industry transformation. However, some negative impacts will also emerging, such as ecological environment deterioration, employment structure disequilibrium, no-guarantee information assurance, etc.

Fast updated technologies is a double-edged sword in urbanization construction, so, making prediction models is necessary for avoiding adverse impacts they could emerge in smart city construction.

#### 2.6 Urban Sustainable, Energy-saving Technologies and Case Study

Energy-saving and emission-reduction is important strategic choices of the human response to global warming. In July 2010, the International Energy Agency released a report that China has become the world's largest carbon footprint and energy consuming country. At the same time, China is in a critical period of building a moderately prosperous society and an important stage of rapid development of urbanization, so the energy demand will continue to grow. Respond to climate change actively is a major strategy for economic and social development, but also a major opportunity to accelerate the economic development pattern and economic restructuring.

In China, the transportation, construction and industrial manufacturing are the three main energy consumptions. New energy vehicles, retrofitting of existing buildings, Industrial 4.0 and other development application only conforms to the national energy conservation strategy, but also to protect the environment and improve the development of sustainable urbanization.

CSUS Smart City Joint Lab is committed to environmental management and energy-saving technology research, and domestic and foreign universities, research institutions and enterprises to explore the city and regional low-carbon economy and sustainable development. Combined with previous research results and future priorities, we decided to carry out cooperation in related subjects. Including but not limited to:

1) The research of regional and urban low-carbon economy development mode;

2) The research of urban energy planning studies;

3) The research of energy conservation measurement technology;

4) The research new energy technology;

5) The analysis of European energy saving technology and case studies;

6) Study on key technology and evaluation system of urban renewable energy smart grid

## 2. Application Requirements

### a. Research Periods

2 years for strategic field research;

3 years for cutting-edge technology research (in principle)

### b. Founding Source

Chinese national projects funds, joint lab self-financing, and enterprise sponsoring.

### 3. Consulting

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